

HN462732, HN462732G

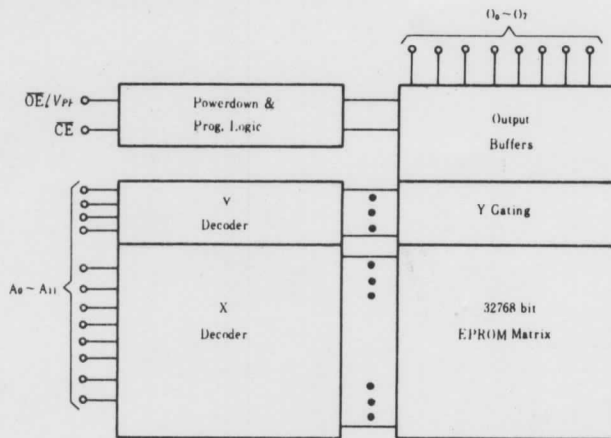
4096-word \times 8-bit U.V. Erasable and Programmable Read Only Memory

The HN462732 is a 4096 word by 8 bit erasable and electrically programmable ROM. This device is packaged in a 24-pin, dual-in-line package with transparent lid. The transparent lid allows the user to expose the chip to ultraviolet light to erase the bit pattern, whereby a new pattern can then be written into the device.

FEATURES

- Single Power Supply +5V \pm 5%
- Simple Programming Program Voltage: +25V D.C.
Program with One 50ms Pulse
- Static No Clocks Required
- Inputs and Outputs TTL Compatible During Both Read and Program Modes
- Fully Decoded On-Chip Address Decode
- Access Time 450ns (max)
- Low Power Dissipation 150mA (max) Active Currents
30mA (max) Standby Current
- Three State Output OR-Tie-Capability
- Compatible with INTEL 2732

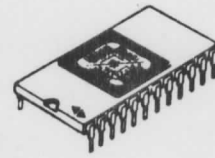
BLOCK DIAGRAM



MODE SELECTION

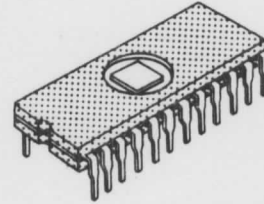
Mode	Pins	\overline{CE} (18)	\overline{OE}/V_{PP} (20)	V_{CC} (24)	Outputs (9~11, 13~17)
Read		V_{IL}	V_{IL}	+5	Dout
Stand by		V_{IH}	Don't Care	+5	High Z
Program		V_{IL}	V_{PP}	+5	Din
Program Verify		V_{IL}	V_{IL}	+5	Dout
Program Inhibit		V_{IH}	V_{PP}	+5	High Z

HN462732



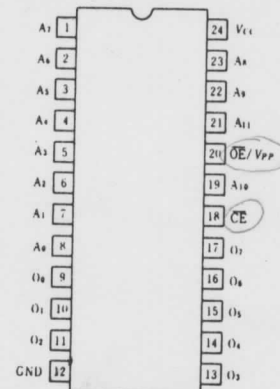
(DC-24C)

HN462732G



(DG-24B)

PIN ARRANGEMENT



(Top View)

■ ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Value	Unit
Operating Temperature Range	T_{op}	0 to +70	°C
Storage Temperature Range	T_{stg}	-65 to +125	°C
All Input and Output Voltage*	V_T	-0.3 to +7	V
V_{PP} Voltage*	\overline{OE}/V_{PP}	-0.3 to +28	V

* With respect to GND

■ READ OPERATION

● DC AND OPERATING CHARACTERISTICS ($T_a=0$ to +70°C, $V_{CC}=5V \pm 5\%$, $V_{PP}=V_{CC} \pm 0.6V$)

Parameter	Symbol	Test Condition	min.	typ.	max.	Unit
Input Leakage Current (Except \overline{OE}/V_{PP})	I_{L1}	$V_{IN}=5.25V$	—	—	10	μA
\overline{OE}/V_{PP} Input Leakage Current	I_{L12}	$V_{IN}=5.25V$	—	—	10	μA
Output Leakage Current	I_{LO}	$V_{out}=5.25V$	—	—	10	μA
V_{CC} Current (Standby)	I_{CC1}	$\overline{CE}=V_{IH}$, $\overline{OE}=V_{IL}$	—	—	30	mA
V_{CC} Current (Active)	I_{CC2}	$\overline{OE}=\overline{CE}=V_{IL}$	—	—	150	mA
Input Low Voltage	V_{IL}		-0.1	—	0.8	V
Input High Voltage	V_{IH}		2.0	—	$V_{CC}+1$	V
Output Low Voltage	V_{OL}	$I_{OL}=2.1mA$	—	—	0.45	V
Output High Voltage	V_{OH}	$I_{OH}=-400\mu A$	2.4	—	—	V

● AC CHARACTERISTICS ($T_a=0$ to +70°C, $V_{CC}=5V \pm 5\%$, $V_{PP}=V_{CC} \pm 0.6V$)

Parameter	Symbol	Test Condition	min	typ	max	Unit
Address to Output Delay	t_{ACC}	$\overline{CE}=\overline{OE}=V_{IL}$	—	—	450	ns
\overline{CE} to Output Delay	t_{CE}	$\overline{OE}=V_{IL}$	—	—	450	ns
Output Enable to Output Delay	t_{OE}	$\overline{CE}=V_{IL}$	—	—	120	ns
Output Enable High to Output Float*	t_{DF}	$\overline{CE}=V_{IL}$	0	—	100	ns
Address to Output Hold	t_{OH}	$\overline{CE}=\overline{OE}=V_{IL}$	0	—	—	ns

* t_{DF} defines the time at which the output achieves the open circuit condition and is not referenced to output voltage levels.

● SWITCHING CHARACTERISTICS

Test Condition

Input Pulse Levels:

0.8V to 2.2V

Input Rise and Fall Times:

 $\leq 20ns$

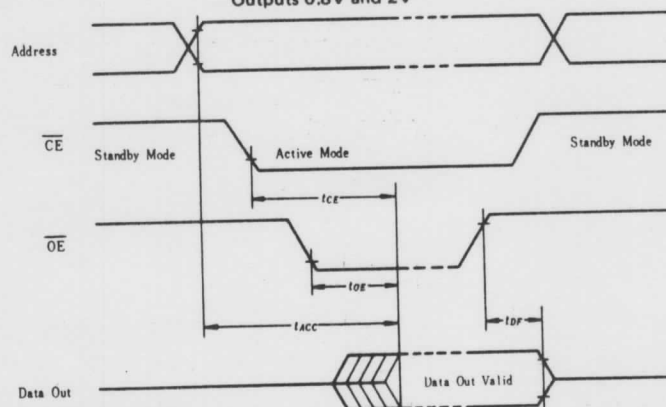
Output Load:

1TTL Gate + 100pF

Reference Level for Measuring Timing:

Inputs 1V and 2V

Outputs 0.8V and 2V



● CAPACITANCE ($T_a=25^\circ C$, $f=1MHz$)

Parameter	Symbol	Test Condition	min.	typ.	max.	Unit
Input Capacitance (Except \overline{OE}/V_{PP})	C_{IN1}	$V_{IN}=0V$	—	—	6	pF
\overline{OE}/V_{PP} Input Capacitance	C_{IN2}	$V_{IN}=0V$	—	—	20	pF
Output Capacitance	C_{out}	$V_{out}=0V$	—	—	12	pF

PROGRAMMING OPERATION

DC PROGRAMMING CHARACTERISTICS ($V_{CC}=5V \pm 5\%$, $V_{PP}=25V \pm 1V$, $T_a=25^\circ C \pm 5^\circ C$)

Parameter	Symbol	Test Condition	min.	typ.	max.	Unit
Input Leakage Current	I_{LI}	$V_{IN}=5.25V/0.4V$	—	—	10	μA
Output Low Voltage During Verify	V_{OL}	$I_{OL}=2.1mA$	—	—	0.4	V
Output High Voltage During Verify	V_{OH}	$I_{OH}=-400\mu A$	2.4	—	—	V
V_{CC} Supply Current	I_{CC}		—	—	150	mA
Input Low Level	V_{IL}		-0.1	—	0.8	V
Input High Level (All Input Except \overline{OE}/V_{PP})	V_{IH}		2.0	—	$V_{CC}+1$	V
V_{PP} Supply Current	I_{PP}	$\overline{CE}=V_{IL}, \overline{OE}=V_{PP}$	—	—	30	mA

AC PROGRAMMING CHARACTERISTICS ($V_{CC}=5V \pm 5\%$, $V_{PP}=25V \pm 1V$, $T_a=25^\circ C \pm 5^\circ C$)

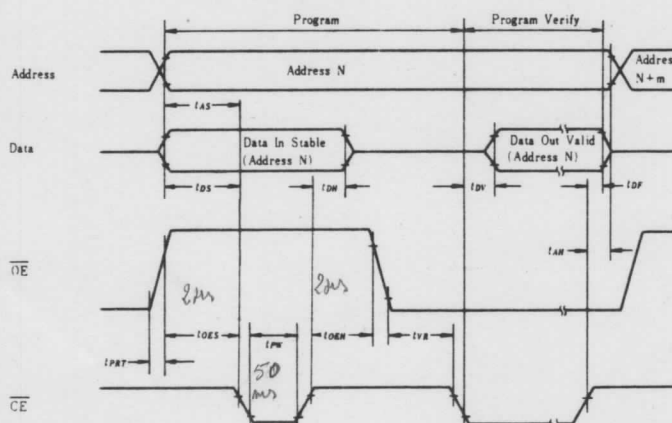
Parameter	Symbol	Test Condition	min.	typ.	max.	Unit
Address Setup Time	t_{AS}		2	—	—	μs
\overline{OE} Setup Time	t_{OES}		2	—	—	μs
Data Setup Time	t_{DS}		2	—	—	μs
Address Hold Time	t_{AH}		0	—	—	μs
\overline{OE} Hold Time	t_{OEH}		2	—	—	μs
Data Hold Time	t_{DH}		2	—	—	μs
Chip Enable to Output Float Delay*	t_{DF}		0	—	120	ns
Data Valid from \overline{CE}	t_{DV}	$\overline{CE}=V_{IL}, \overline{OE}=V_{IL}$	—	—	1	μs
\overline{CE} Pulse Width During Programming	t_{PW}		45	50	55	ms
\overline{OE} Pulse Rise Time During Programming	t_{PRT}		50	—	—	ns
V_{PP} Recovery Time	t_{VR}		2	—	—	μs

* t_{DF} defines the time at which the output achieves the open circuit condition and is not referenced to output voltage levels.

SWITCHING CHARACTERISTICS

Test Conditions

Input Pulse Level: 0.8V to 2.2V
Input Rise and Fall Times: $\leq 20ns$
Output Load: 1TTL Gate + 100pF
Reference Level for Measuring Timing: Inputs; 1V and 2V, Outputs; 0.8V and 2V

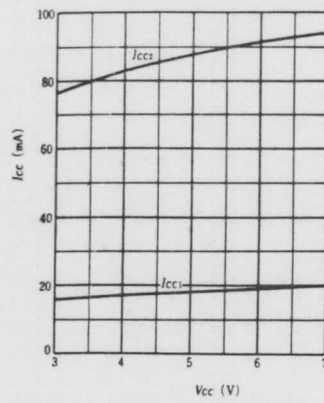


ERASE

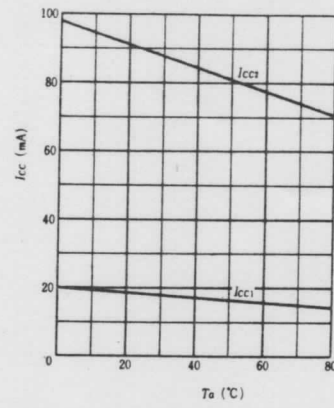
Erase of HN462732 is performed by exposure to Ultra-violet light of 2537Å, and all the output data are changed to "1" after this procedure.

The minimum integrated dose (i.e., UV intensity x exposure time) for erasure is $15W \cdot sec/cm^2$.

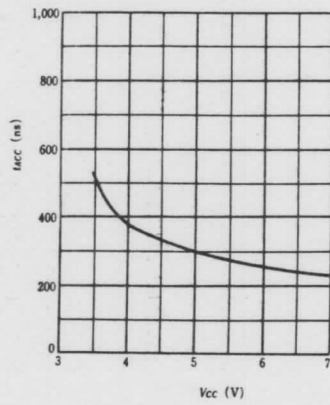
SUPPLY CURRENT vs. SUPPLY VOLTAGE



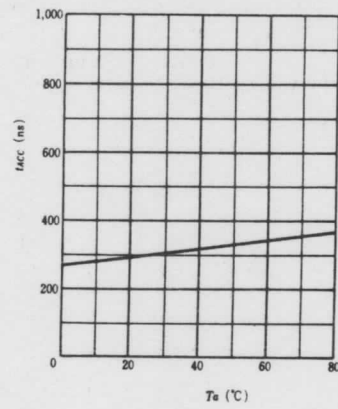
SUPPLY CURRENT vs. AMBIENT TEMPERATURE



ACCESS TIME vs. SUPPLY VOLTAGE



ACCESS TIME vs. AMBIENT TEMPERATURE



HN462532, HN462532G

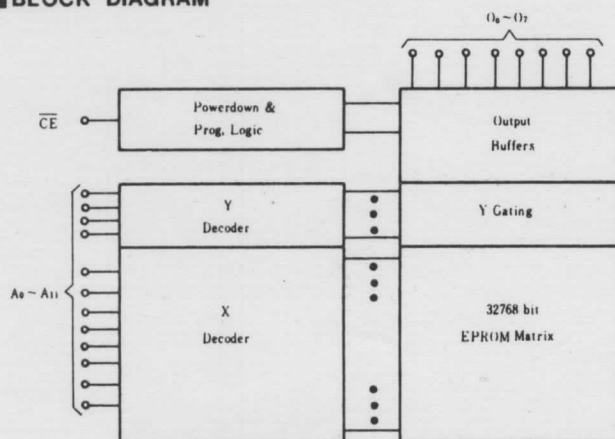
4096-word × 8-bit U. V. Erasable and Programmable Read Only Memory

The HN462532 is a 4096 word by 8 bit erasable and electrically programmable ROM. This device is packaged in a 24-pin, dual-in-line package with transparent lid. The transparent lid allows the user to expose the chip to ultraviolet light to erase the bit pattern, whereby a new pattern can then be written into the device.

FEATURES

- Single Power Supply +5V ±5%
- Simple Programming Program Voltage: +25V D.C.
Program with One 50ms Pulse
- Static No Clocks Required
- Inputs and Outputs TTL Compatible During Both Read and Program Modes
- Fully Decoded On-Chip Address Decode
- Access Time 450ns (max.)
- Low Power Dissipation 858mW (max) Active Power
201mW (max) Standby Power
- Three State Output OR-Tie Capability
- Compatible with TMS2532

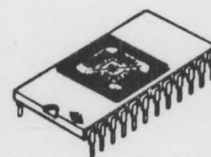
BLOCK DIAGRAM



MODE SELECTION

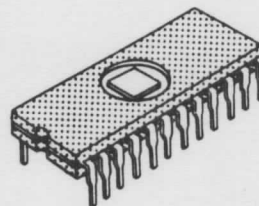
Mode	Pins	CE (20)	V _{PP} (21)	V _{CC} (24)	Outputs (9 to 11, 13 to 17)
Read		V _{IL}	+5	+5	Dout
Stand by		V _{IH}	+5	+5	High Z
Program		Pulsed V _{IH} to V _{IL}	+25	+5	Din
Program Inhibit		V _{IH}	+25	+5	High Z

HN 462532



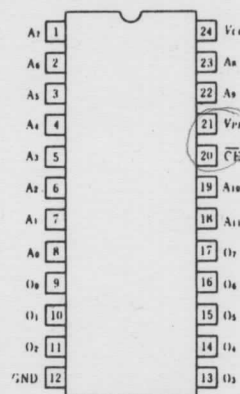
(DC-24C)

HN462532G



(DG-24B)

PIN ARRANGEMENT



(Top View)

■ ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Value	Unit
All Input and Output Voltages*	V_T	-0.3 to +7	V
V_{PP} Voltage*	V_{PP}	-0.3 to +28	V
Operating Temperature Range	T_{op}	0 to +70	°C
Storage Temperature Range	T_{stg}	-65 to +125	°C

* With respect to GND.

■ READ OPERATION

● DC AND OPERATING CHARACTERISTICS ($T_a=0$ to +70°C, $V_{CC}=5V \pm 5\%$, $V_{PP}=V_{CC} \pm 0.6V$)

Parameter	Symbol	Test Condition	min	typ	max	Unit
Input Leakage Current	I_{LI}	$V_{in} = 5.25V$	—	—	10	μA
Output Leakage Current	I_{LO}	$V_{out} = 5.25V / 0.4V$	—	—	10	μA
V_{PP} Current	I_{PP1}	$V_{PP} = 5.85V$	—	—	12	mA
V_{CC} Current (Standby)	I_{CC1}	$\overline{CE} = V_{IH}$	—	—	25	mA
V_{CC} Current (Active)	I_{CC2}	$\overline{CE} = V_{IL}$	—	—	150	mA
Input Low Voltage	V_{IL}		-0.1	—	0.8	V
Input High Voltage	V_{IH}		2.0	—	$V_{CC} + 1$	V
Output Low Voltage	V_{OL}	$I_{OL} = 2.1mA$	—	—	0.4	V
Output High Voltage	V_{OH}	$I_{OH} = -400\mu A$	2.4	—	—	V

Note: V_{CC} must be applied simultaneously or before V_{PP} and removed simultaneously or after V_{PP} .

● AC CHARACTERISTICS ($T_a=0$ to +70°C, $V_{CC}=5V \pm 5\%$, $V_{PP}=V_{CC} \pm 0.6V$)

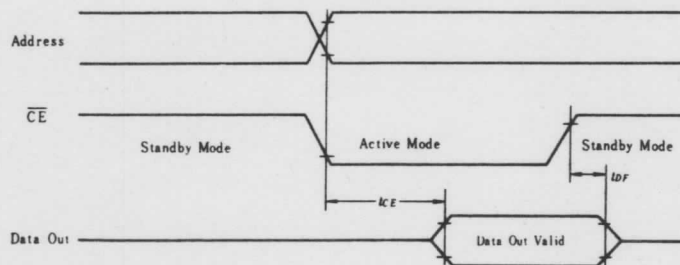
Parameter	Symbol	Test Condition	min	typ	max	Unit
Address to Output Delay	t_{ACC}	$\overline{CE} = V_{IL}$	—	—	450	ns
\overline{CE} to Output Delay	t_{CE}		—	—	450	ns
\overline{CE} High to Output Float*	t_{DF}		0	—	100	ns
Address to Output Hold	t_{OH}	$\overline{CE} = V_{IL}$	0	—	—	ns

*: t_{DF} defines the time at which the output achieves the open circuit condition and is not referenced to output voltage levels.

● SWITCHING CHARACTERISTICS

Test Conditions

Input Pulse Levels: 0.8V to 2.2V
 Input Rise and Fall Times: ≤ 20 ns
 Output Load: 1TTL Gate + 100pF
 Reference Level for Measuring Timing: Inputs: 1V and 2V, Outputs: 0.8V and 2V



● CAPACITANCE ($T_a=25^\circ C$, $f=1MHz$)

Parameter	Symbol	Test Condition	min	typ	max	Unit
Input Capacitance	C_{in}	$V_{in} = 0V$	—	—	6	pF
Output Capacitance	C_{out}	$V_{out} = 0V$	—	—	12	pF

PROGRAMMING OPERATION

DC PROGRAMMING CHARACTERISTICS ($T_a = 25^\circ\text{C} \pm 5^\circ\text{C}$, $V_{CC} = 5\text{V} \pm 5\%$, $V_{PP} = 25\text{V} \pm 1\text{V}$)

Parameter	Symbol	Test Condition	min	typ	max	Unit
Input Leakage Current	I_{LI}	$V_{is} = 5.25\text{V} / 0.4\text{V}$	—	—	10	μA
V_{PP} Supply Current During Programming	I_{PPS}	$\overline{\text{CE}} = V_{IL}$	—	—	30	mA
V_{CC} Supply Current	I_{CC}		—	—	150	mA
Input Low Level	V_{IL}		-0.1	—	0.8	V
Input High Level	V_{IH}		2.0	—	$V_{CC} + 1$	V

AC PROGRAMMING CHARACTERISTICS ($T_a = 25^\circ\text{C} \pm 5^\circ\text{C}$, $V_{CC} = 5\text{V} \pm 5\%$, $V_{PP} = 25\text{V} \pm 1\text{V}$)

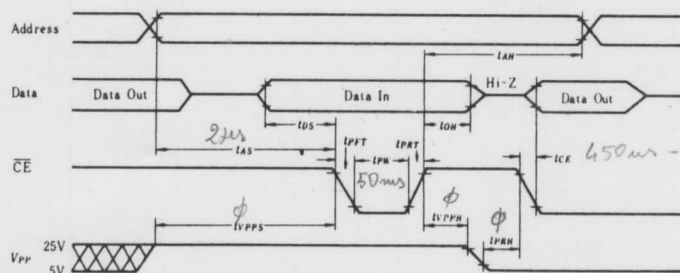
Parameter	Symbol	Test Condition	min	typ	max	Unit
Address Setup Time	t_{AS}		2	—	—	μs
Data Setup Time	t_{DS}		2	—	—	μs
Address Hold Time	t_{AH}		2	—	—	μs
Data Hold Time	t_{DH}		2	—	—	μs
Setup Time from V_{PP}	t_{VPPS}		0	—	—	ns
Program Pulse Hold Time	t_{PRH}		0	—	—	ns
V_{PP} Hold Time	t_{VPPH}		0	—	—	ns
Program Pulse Width	t_{PW}		45	50	55	ms
Program Pulse Time	t_{PRT}		5	—	—	ns
Program Pulse Time	t_{PFT}		5	—	—	ns

Note: V_{CC} must be applied simultaneously or before V_{PP} and removed simultaneously or after V_{PP} .

SWITCHING CHARACTERISTICS

Test Conditions

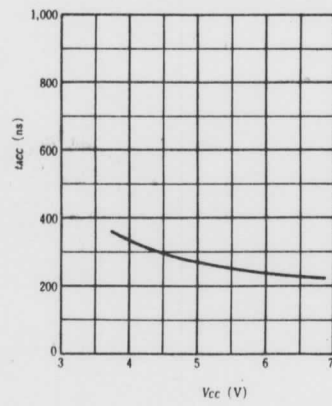
Input Pulse Level:	0.8V to 2.2V
Input Rise and Fall Times:	$\leq 20\text{ ns}$
Output Load:	1TTL Gate + 100pF
Reference Level for Measuring Timing:	Inputs; 1V and 2V, Outputs; 0.8V and 2V



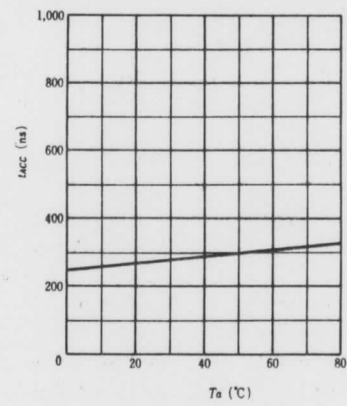
ERASE

Erasure of HN462532 is performed by exposure to ultra-violet light with a wavelength of 2537\AA , and all the output data are changed to "1" after this erasure procedure. The minimum integrated dose (i.e., UV intensity \times exposure time) for erasure is $15\text{W} \cdot \text{sec}/\text{cm}^2$.

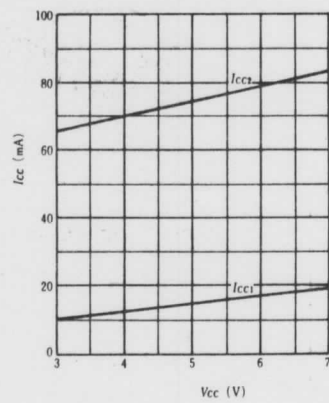
ACCESS TIME vs. SUPPLY VOLTAGE



ACCESS TIME vs. AMBIENT TEMPERATURE



SUPPLY CURRENT vs. SUPPLY VOLTAGE



SUPPLY CURRENT vs. AMBIENT TEMPERATURE

